Electronic Supplementary Material (ESI)

This journal is © The Royal Society of Chemistry 2014

# Supporting Information

# Facile synthesis of CoX (X=S, P) as efficient electrocatalysts for hydrogen evolution reaction

*Jiayuan Li[a], Xuemei Zhou[a], Zhaoming Xia[a], Zhiyun Zhang[a], Jing Li[a], Yuanyuan Ma\*[ab],*

*Yongquan Qu\*[abc]*


*[a] Center of Applied Chemical Research, Frontier Institute of Science and Technology, Xi'an Jiaotong University, Xi'an, China 710049.*

*[b] State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an, China, 710049.*

*[c] MOE Key Laboratory for Nonequilibrium Synthesis and Modulation of Condensed Matter, Xi'an Jiaotong University, Xi'an, China 710049*


*E-mail: yongquan@mail.xjtu.edu.cn; yyma@mail.xjtu.edu.cn*

**TOF calculation:**

Cyclic voltammetry measurements of our samples were carried out in PBS electrolyte (PH=7) with a potential window from −0.2 to 0.6 V vs RHE and a scan rate of 50 mV/s. Assuming one electron redox process, the integrated charge over the whole potential range was divided by two. Then, the value was divided by the Faraday constant to get the number of active sites for different samples. The turnover frequency ($s^{-1}$) can be estimated according to this equation:

$$TOF = I/2nF$$

where $I$ represents the current density for different samples during the LSV measurement in 0.5 M $H_2SO_4$, $F$ is the Faraday constant (C/mol), and $n$ is the number of the active sites (mol) for different samples.
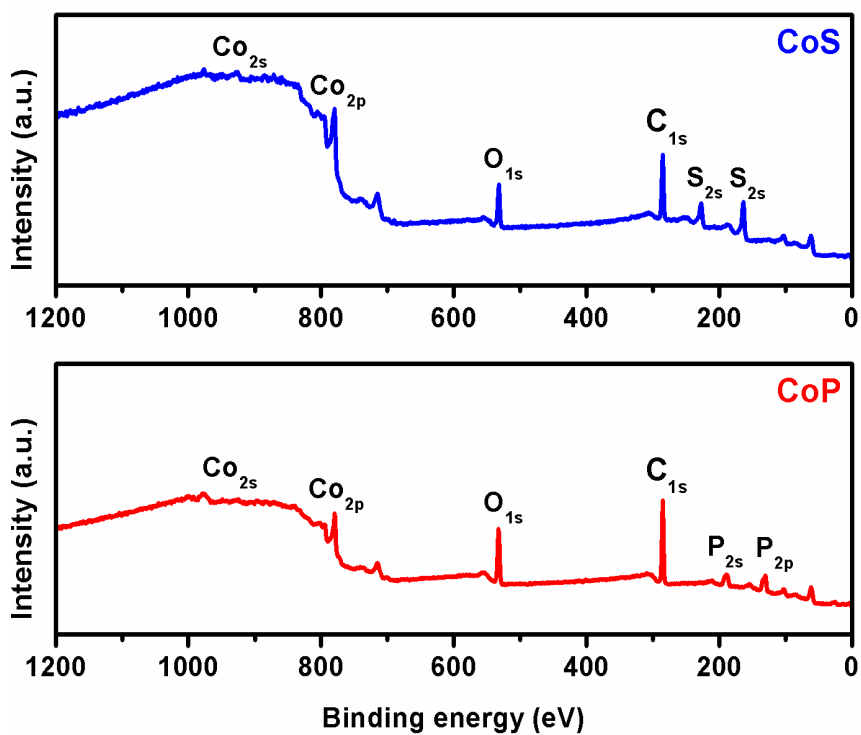
**Figure S1.** The XPS survey spectra of the as-prepared CoS and CoP samples.
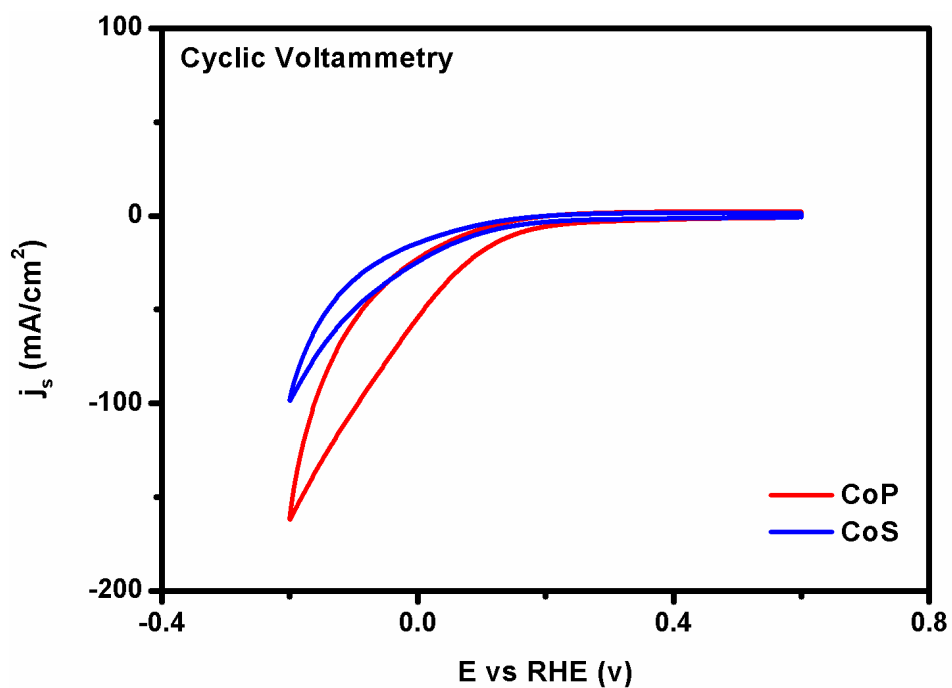


**Figure S2.** The cyclic voltammetrys for CoS and CoP nanoplate in 1.0 M PBS at a scan rate of 50 mV/s.